It was noted in §4.2 that the resonance in the sun gear averages between 75 and 110 shaft orders was probably being excited by the impacts generated by the fault as it meshed with each of the five planets. Supporting evidence for this is shown in ~~Figure 5.1~~ the figures, which displays the spectra of the sun gear averages from a Seahawk gearbox at the same torque (350 lb ft.) without a sun gear fault. While these are from a different gearbox, which will necessarily have slightly different vibration, it can clearly be seen that the amplitudes of the frequencies in the shaded resonance band are very low compared to those in Figure 4.15. It should also be noted that, while this gearbox did not have a sun gear fault, it did have a seeded planet gear fault (half a tooth removed form one planet), which would also have produced resonance-exciting impacts as it meshed with the sun and ring gears. However, the frequency of these impacts would have been non-synchronous with the relative sun gear rotation, and thus have been attenuated during the averaging process. It follows from this, that the amplitude of the vibration in the resonance band may therefore be a useful indicator of the presence of a sun gear fault. However, the seeded-fault in this test is very severe, and this method of sun gear fault detection may not be so effective with a natural incipient fault.

Respectfully submitted,

William W. Haefliger
Attorney for Applicant
Registration No.17,120
Area Code 323 684-2707

WWH:hk
Encl.
Docket 12,469